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TS-PIC-91722
August 1991

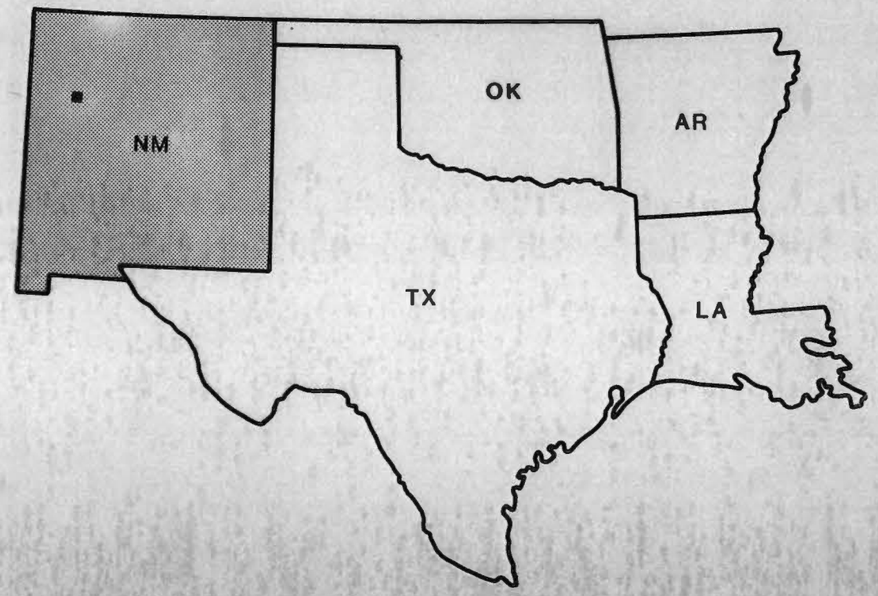
Research and Development

EPA

AERIAL PHOTOGRAPHIC ANALYSIS OF THE BROWN-VANDEVER AND DESIDERO URANIUM MINES

McKinley County, New Mexico

EPA Region 6



TS-PIC-91722
August 1991

AERIAL PHOTOGRAPHIC ANALYSIS OF THE BROWN-VANDEVER AND DESIDERO URANIUM MINES

McKinley County, New Mexico

by

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Contract No. 68-CO-0050

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ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
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This document has undergone a technical and quality control/assurance review and approval by personnel of the EPA/ORD Environmental Monitoring Systems Laboratory at Las Vegas, (EMSL-LV), and is for internal Agency use and distribution only.

ABSTRACT

This report presents an analysis of the Brown-Vandever and Desidero Mines located in McKinley County, New Mexico near the town of Bluewater. Current color aerial photography acquired on December 7, 1990, was used to perform the analysis.

Photointerpreted data contained locations of uranium deposits, limestone bedrock, soil overburden, and a mine entrance, as well as cultural features such as homes, telephone poles, property and fence lines, and animal enclosures were collected with an AP190 stereoplotter and assigned precise X, Y, and Z coordinates. These coordinates were used to produce line maps depicting these features. Volumetric estimates of uranium deposits were calculated.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, prepared this report for the Agency's Emergency Response Section in Region 9 located at San Francisco, CA and Office of Emergency and Remedial Response in Washington, D.C.

CONTENTS

FIGURES

TABLES

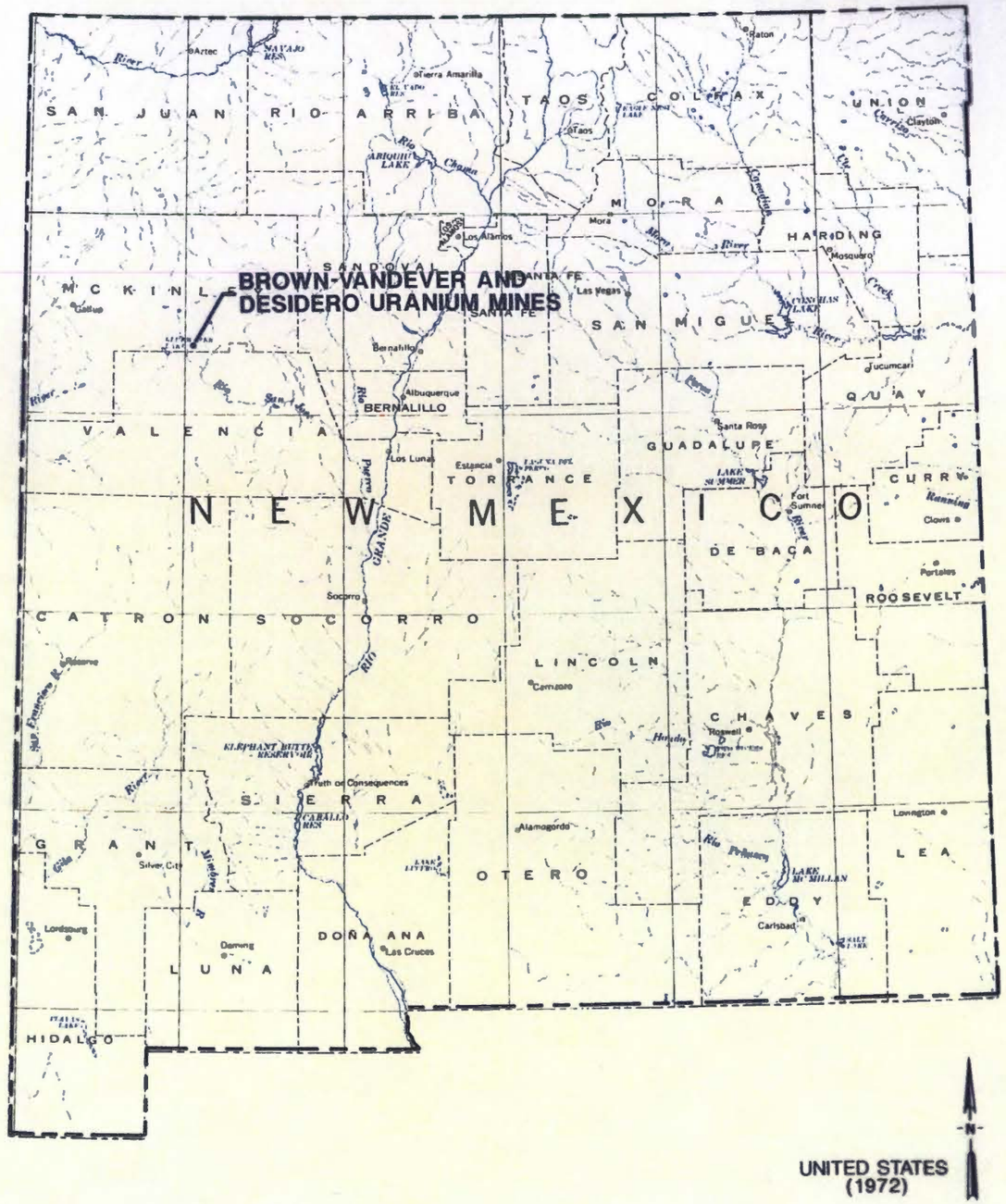

Figure 1. Site location map, New Mexico. Scale 1:2,500,000.

INTRODUCTION

This report presents an analysis of Brown-Vandever and Desidero Uranium Mines located in McKinley County, New Mexico near the town of Bluewater (Figures 1 and 2). Color aerial photography dated December 7, 1990 was used to perform the analysis.

The Brown-Vandever and Desidero uranium mines were active from approximately 1952 to 1966 and from 1952 to 1957 respectively, and then abandoned. These mines are under consideration as a potential hazard to human health because several homesites are located nearby. The mines are situated on high mesas with surface drainage trending to the southeast and southwest at Brown-Vandever and to the south at Desidero. No flooding potential would exist as the result of a 100-year flood event. Brown-Vandever occupies approximately 155 acres and Desidero is approximately 130 acres in extent.

Background information on site conditions was furnished by the Emergency Response Section of EPA Region 9.

This report was produced by the U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, at the request of the Agency's Emergency Response Section in Region 9 located in San Francisco, CA and Office of Emergency and Remedial Response in Washington, D.C.

METHODOLOGY

Stereoscopic pairs of current color aerial photographs were used to perform the analysis. Stereo viewing enhances the interpretation because it allows the analyst to observe the vertical as well as horizontal spatial relationships of natural and cultural features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors that can be found within the study area.

Drainage analysis determines the direction a spill or surface runoff containing contaminants would follow. Direction of drainage is determined from analysis of the photographs and from U.S. Geological Survey topographic maps. Whenever they are available, 7.5-minute quadrangle maps (scale 1:24,000) are used to show site location and to provide geographic and topographic information.

The AP190 Analytical Stereoplotter is a highly precise PC-based photogrammetric mapping instrument which has a number of uses in the environmental monitoring field. Among these are: volumetric calculations; determination of geographic coordinate data for point features such as wells, sample locations, and property corners; measurements of lines and areas; precise location of historical features no longer existent; and creation of digital elevation models (DEM) for use in Geographic Information System (GIS) applications. A wide variety of formats for data portrayal are available.

Photointerpreted data contained locations of uranium deposits, limestone bedrock, soil overburden, mine entrances, as well as cultural features such as homes, roads, old cars, telephone poles, property and fence lines, and animal enclosures were collected with the AP190 stereoplotter and assigned precise X, Y, and Z coordinates. These coordinates were used to produce line maps depicting these features. Volumetric estimates of uranium deposits were calculated.

Results of the analysis are shown on the planimetric maps (Figures 3 and 5). The following table provides documentation of the photographs used to generate interpreted data for this report:

TABLE 1. DOCUMENTATION OF AERIAL PHOTOGRAPHY

Site name, location, geographic coordinates, and SSID#	Date of acquisition	Original scale	Film type*	Photo source†	Photo I.D.	Frames
Brown-Vandever Mine, McKinley County, NM	12-07-90	1:14,740	CC	EMSL	91722	7
	09-01-52	1:19,675	B&W	EROS	GS-WH	7‡
Section 1 - 35°20' 46"N 108°56'43"W						
Section 2 - 35°21'05"N, 108°57'05"W						
Section 3 - 35°21'00"N, 108°56'23"W						
Section 4 - 35°21'07"N, 108°56'33"W SSID# NM-ZZ						
Desidero Mine, McKinley County, NM	12/07/90	1:5,800	CC	EMSL	91722	36,37
	09/01/52	1:19,675	B&W	EROS	GS-WH	61‡
35°19'59"N, 108°51'37"W SSID# NM-ZZ						

*Film type identification:
B&W: Black-and-white
CC: Conventional Color

†Photo source identification:

EMSL: U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Las Vegas, Nevada
EROS: U.S. Department of the Interior, Geological Survey, Earth Resources Observation Systems Data Center, Sioux Falls, South Dakota

‡These photographs were used to establish a baseline datum for stereoplotter output and were not used for interpretation.

MAP PRODUCTS

Figures 3 and 5 depict the planimetric maps prepared with the AP190 stereoplotter. Legends reference uranium piles, soil overburden, a small debris pile, a thin veneer of loose uranium bearing material atop limestone bedrock (too thin to measure with the stereoplotter), a rectangular uranium deposit (probably transported by truck), drainage, roads, and fencelines. telephone pole locations. Other features include telephone pole locations, old cars, animal enclosures, and a mine entrance.

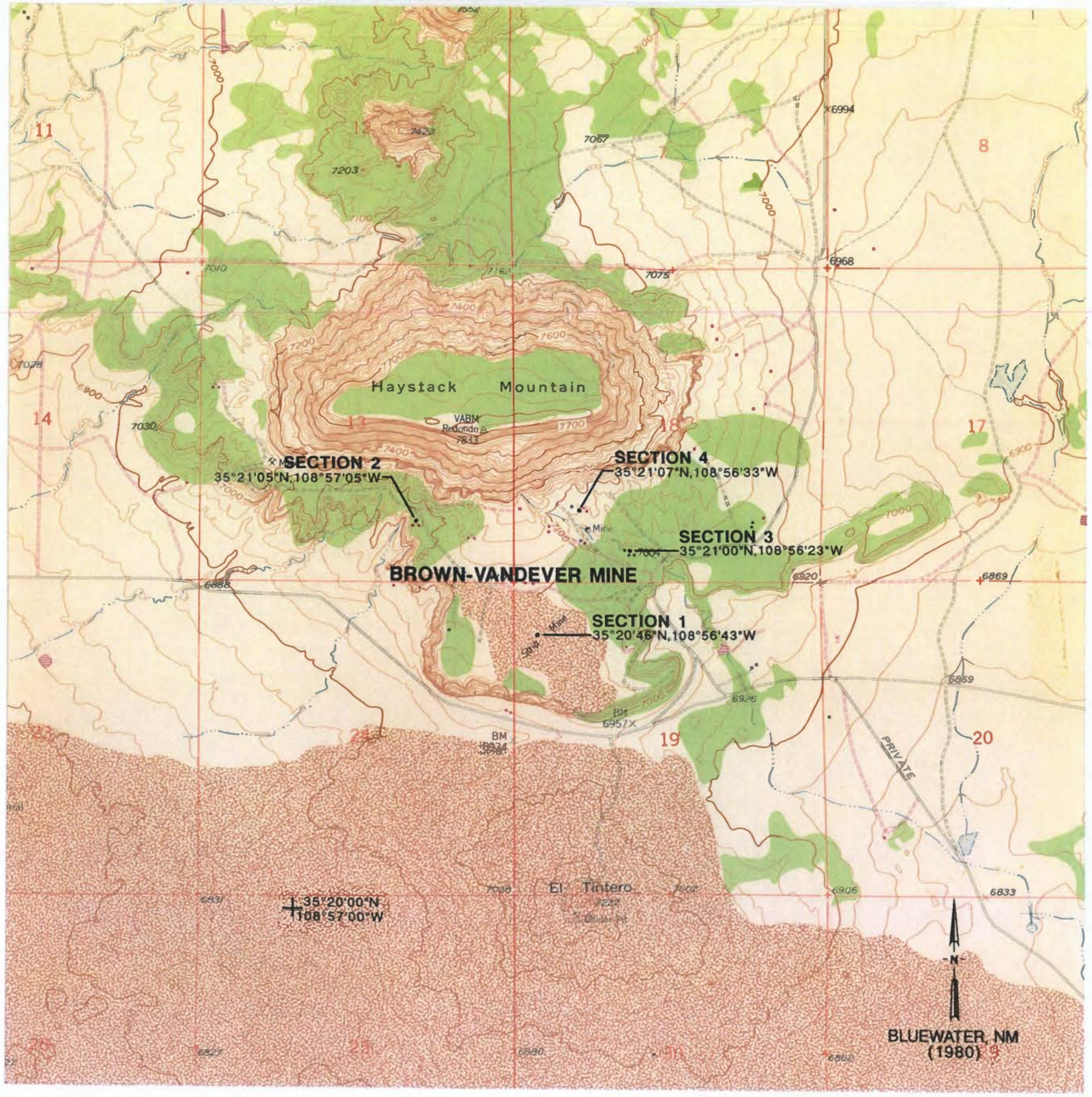

Figure 2. Local site location map, Bluewater, NM. Scale 1:24,000.

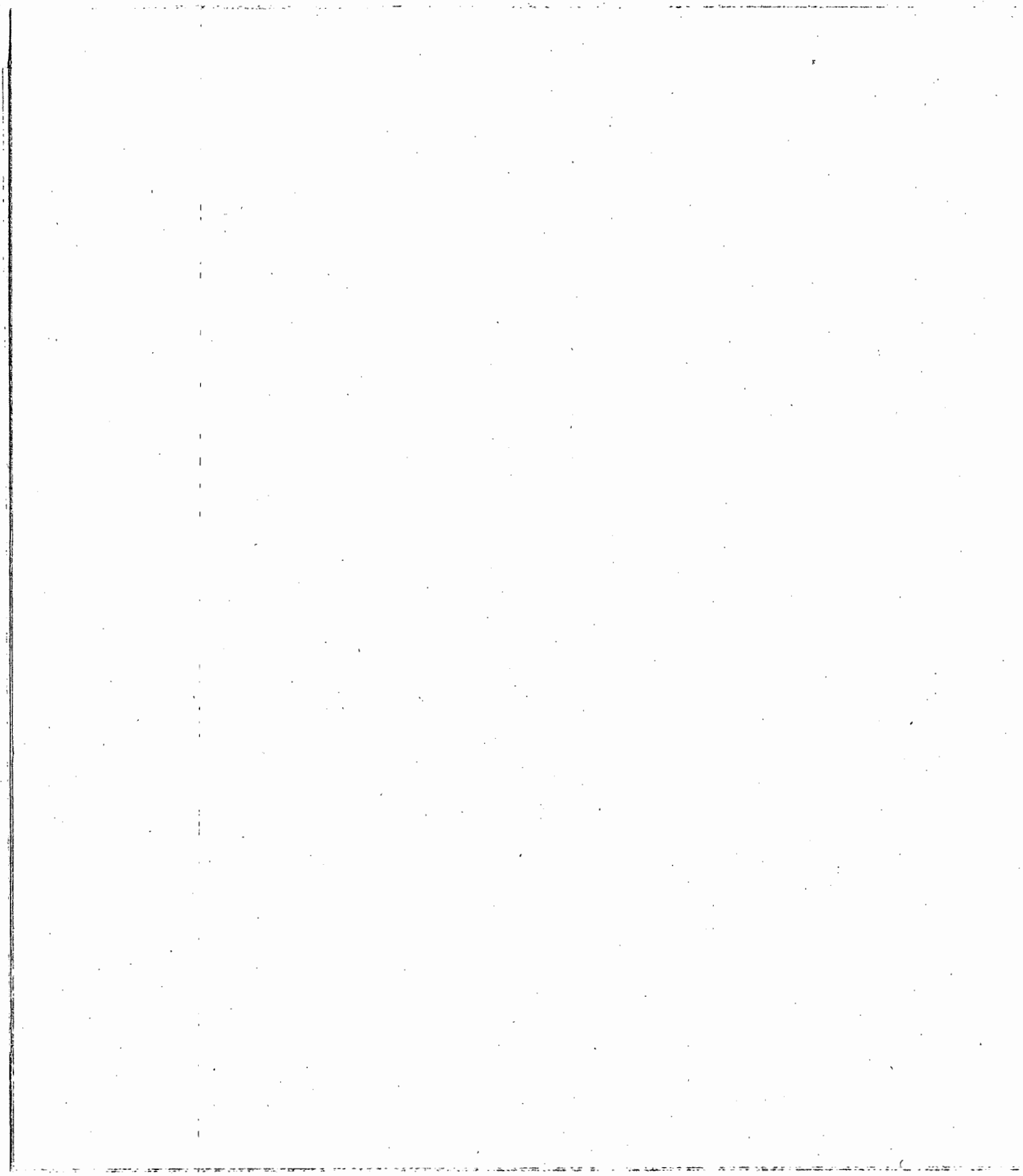

Figure 3. Planimetric Plot of Brown-Vandever Mine, December 7, 1990. Approximate Scale 1:3,600.

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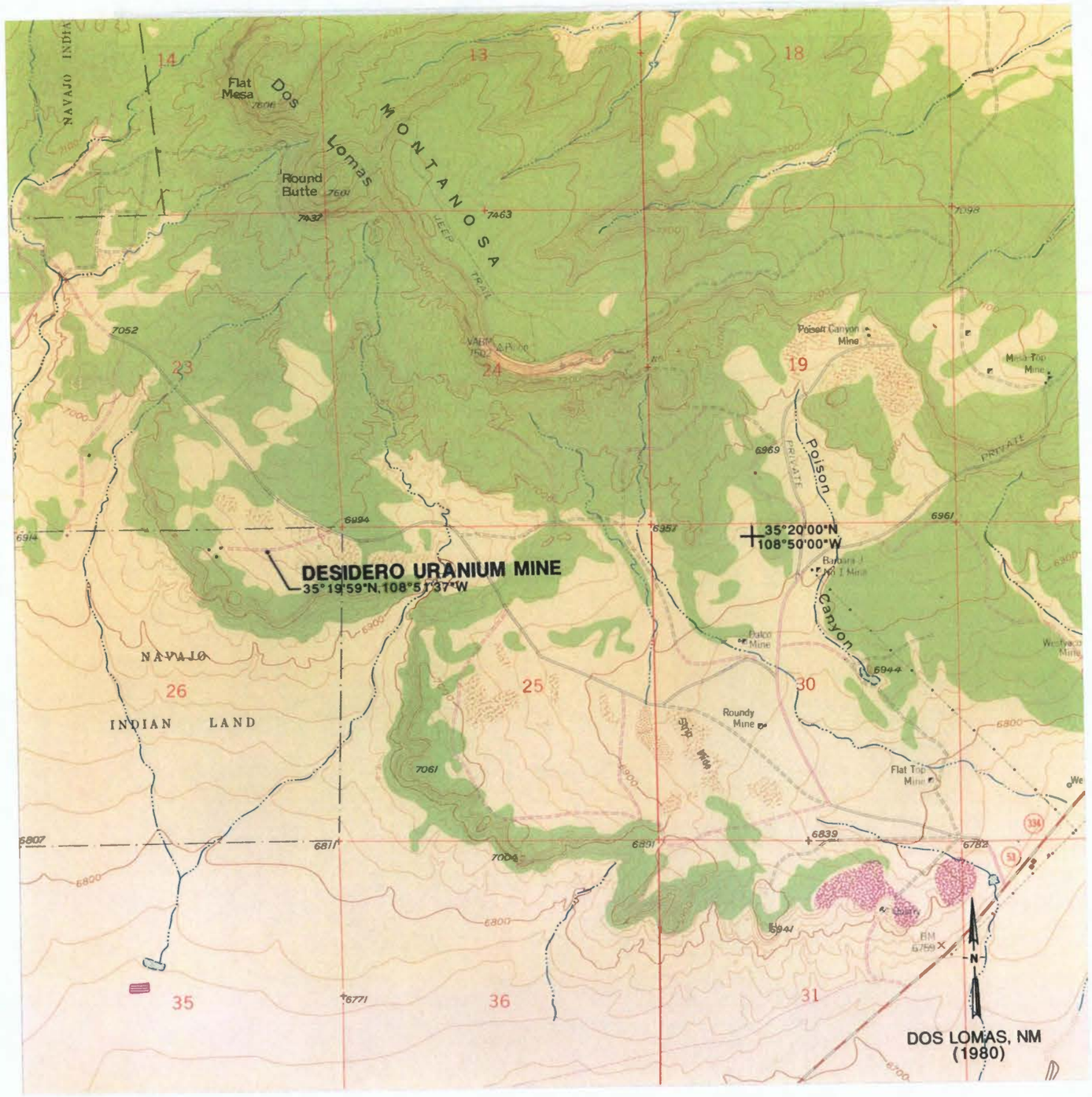

Figure 4. Local site location map, Dos Lomas, NM. Approximate scale 1:24,000.

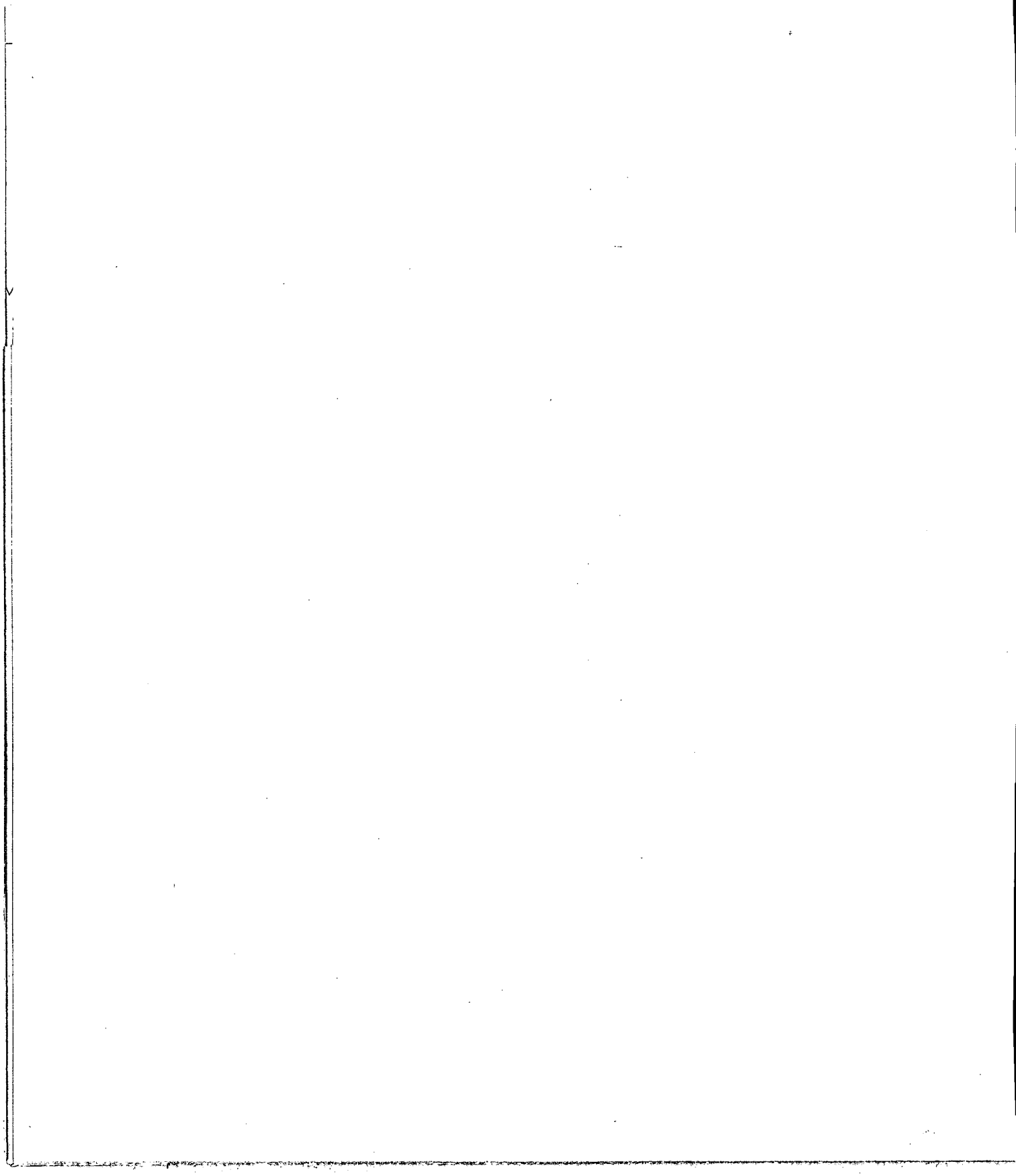

Figure 5. Planimetric Plot of Desidero Mine, December 7, 1990. Approximate scale 1:2,000.

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TS-PIC-92728
July 1992

Research and Development

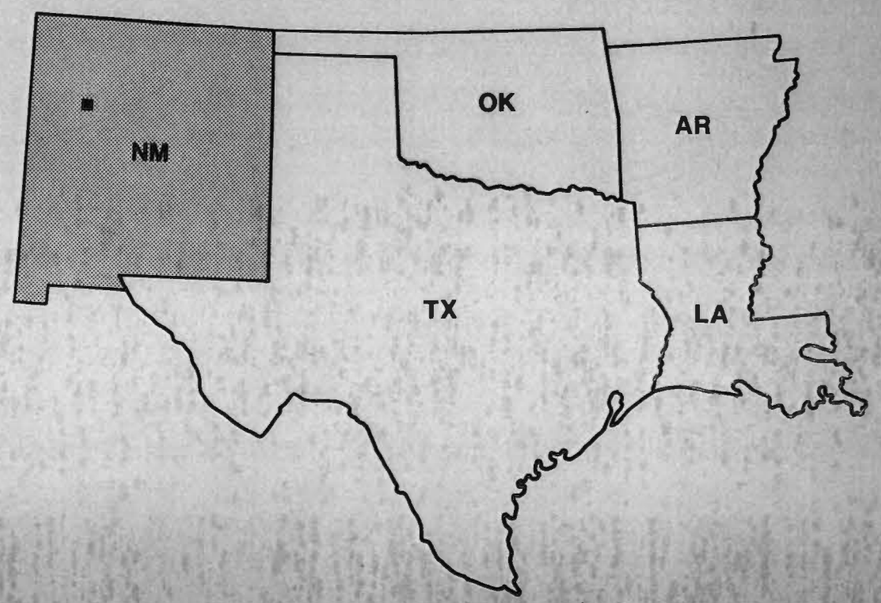
EPA

AERIAL PHOTOGRAPHIC ANALYSIS OF THE BROWN-VAN DEVER AND DESIDERO URANIUM MINES

Supplemental Report

McKinley County, New Mexico

Prepared For
EPA Region 9



TS-PIC-92728
July 1992

AERIAL PHOTOGRAPHIC ANALYSIS OF THE BROWN-VAN DEVER AND DESIDERO URANIUM MINES

SUPPLEMENTAL REPORT

McKinley County, New Mexico

by

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Environmental Programs
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Contract No. 68-C0-0050

Project Officer

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ABSTRACT

This report presents an analysis of the Brown-Van Dever and Desidero Uranium Mines that are located in McKinley County, New Mexico near the town of Bluewater. Current color aerial photography was used to perform the analysis.

Data derived from an AP190 Analytical Stereoplotter on the uranium piles at the mine sites is presented in this report. Clean up of these piles has taken place and the volumetric data for these piles is displayed. Some piles have been removed and others capped. This report compares the volumetric data from the previous report to the new data.

This report was produced by the U. S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada for the Agency's Hazardous Waste Management Division in Region 9 located in San Francisco, California and the Office of Emergency and Remedial Response in Washington D. C.

CONTENTS

FIGURES

TABLE

Figure 1. Study area location map, New Mexico. Scale 1:3,125,000.

INTRODUCTION

This is a supplemental report to TS-PIC-91722 entitled "Aerial Photographic Analysis of the Brown-Van Dever and Desidero Uranium Mines," McKinley County, New Mexico, dated August 1991. Information and numbering systems used in this report were carried over from the first report.

This report presents an analysis of the Brown-Van Dever and Desidero Uranium Mines in McKinley County, New Mexico near the town of Bluewater (see Figures 1, 2 and 11). Color aerial photography acquired on November 11, 1991, was used to perform the analysis.

The mines are situated on high mesas with surface drainage trending to the southeast and southwest at Brown-Van Dever and to the south at the Desidero mine. No flooding potential exists at either site from a 100-year flood event. The Brown-Van Dever mine occupies approximately 155 acres and the Desidero mine area is approximately 130 acres.

This report was produced by the U. S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada for the Agency's Hazardous Waste Management Division in Region 9 located in San Francisco, California and the Office of Emergency and Remedial Response in Washington D. C.

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Results of the analysis are shown on annotated overlays attached to the photos. The following table provides documentation of the photographs used in this report:

TABLE 1. DOCUMENTATION OF AERIAL PHOTOGRAPHY

Site name, location, geographic coordinates, and SSID#	Figures	Date of acquisition	Original scale	Film type*	Photo source†	Photo I.D.	Frames
Brown-Van Dever Mine, McKinley County, NM	3	11-13-91	1:18,000	CC	EMSL	92728	8
	4	11-13-91	1:18,000	CC	EMSL	92728	9
	5	11-13-91	1:18,000	CC	EMSL	92728	7
	6	11-13-91	1:18,000	CC	EMSL	92728	6
Section 1	7	11-13-91	OBLIQUE	CC	EMSL	92728	57
35°20'46"N	8	11-13-91	OBLIQUE	CC	EMSL	92728	56
107°56'40"W	9	11-13-91	OBLIQUE	CC	EMSL	92728	60
Section 2 35°21'05"N 107°57'05"W							
Section 3 35°21'00"N 107°56'23"W							
Section 4 35°21'07"N 107°56'33"W SSID# NM-ZZ							
Desidero Mine, McKinley County, NM	11	11-13-91	1:15,000	CC	EMSL	92728	19
	12	11-13-91	1:15,000	CC	EMSL	92728	19
	13	11-13-91	OBLIQUE	CC	EMSL	92728	54
35°19'59"N 107°51'37"W SSID# NM-ZZ							

*Film type identification:
CC: Conventional Color

†Photo source identification:

EMSL: U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Las Vegas, Nevada

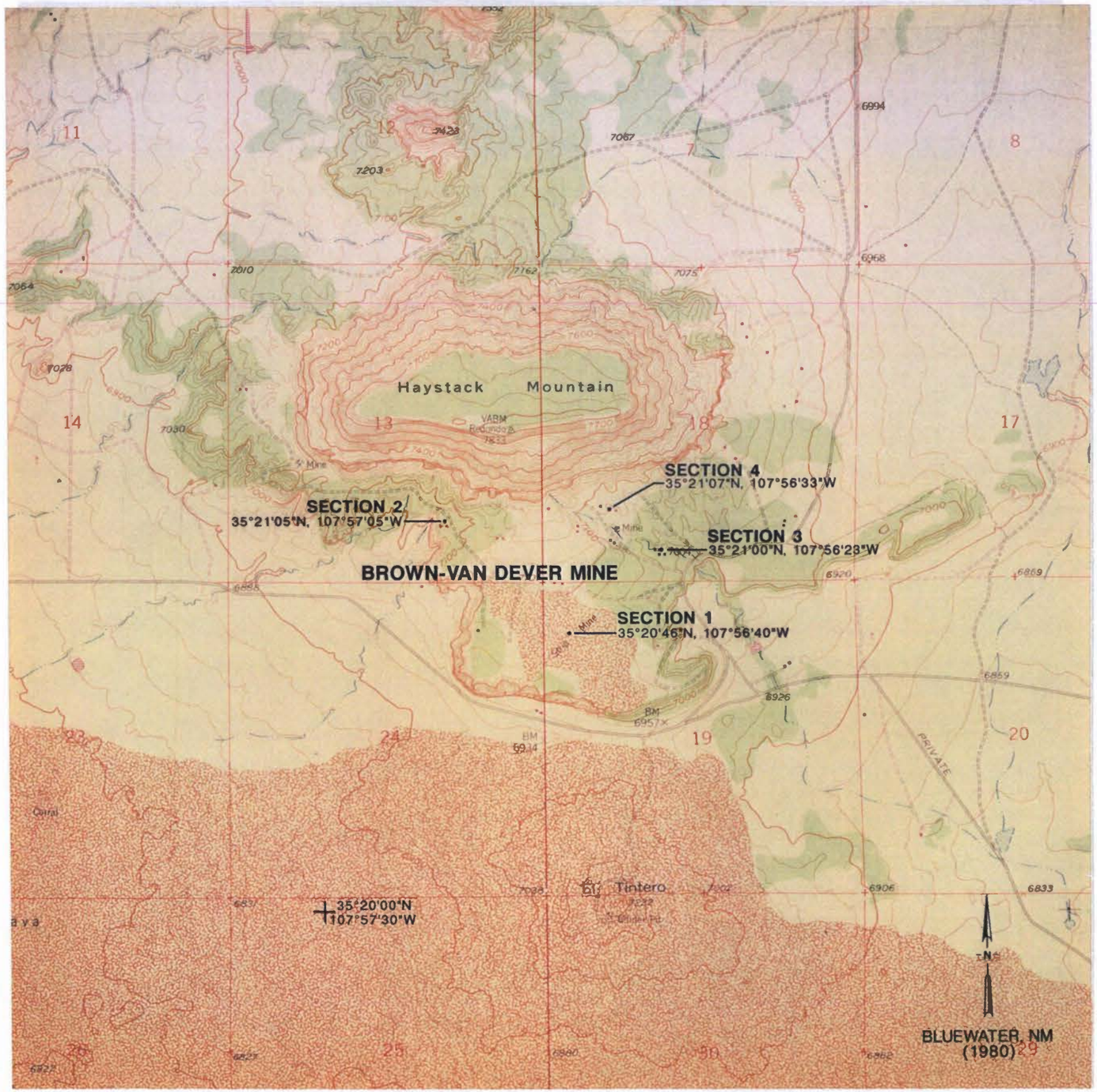

Figure 2. Local study area location map, Bluewater, New Mexico. Approximate scale 1:24,000.

BROWN-VAN DEVER MINE

Figure 2 is a map of the Brown-Van Dever Mine area. Figures 3 through 9 are aerial photographs of the mine area. Since the first report was done, some clean up activity has been done at the mine site. The following tables show which piles were removed and which were not. The numbering system for the piles is the same as the previous report.

Piles that were removed. Volumes are in cubic feet:

Pile	Volume of the pile in cubic feet	Surface area of the pile in square feet	Ground area under the pile in square feet
3	21552	2336	2127
4	29370	4670	682
5	6627	1269	920
6	81225	6831	4113
7	515656	57060	34637
8	480584	32503	18730
9	310814	16744	10890
10	67683	13384	7231
11	59838	4332	4241
12	67293	4826	2415
13	-	-	14746
14	316098	47033	28560
15	34711	3105	1236
16	28960	2100	1198
17	80348	4918	3296
18	125320	15245	9134
19	158337	13410	8142
20	63559	7301	4079
21	-	-	34766
22	42933	4250	2454
23	-	-	3933
24	11137	8794	4080
25	69886	16920	11583
Total removed or capped:	2571931	267031	213193

Piles that still remain. Volumes are cubic feet:

Pile	Volume of the pile in cubic feet	Surface area of the pile in square feet	Ground area under the pile in square feet
1	4022460	227928	137418
2	109096	8773	7073
Total remaining:	4131556	236701	144491

Summary

Total volume removed or capped for 23 piles = 2571931 cubic feet
= 95264 cubic yards
= 38.4% of total volume

Total volume remaining for 2 piles = 4131556 cubic feet
= 153020 cubic yards
= 61.6% of total volume

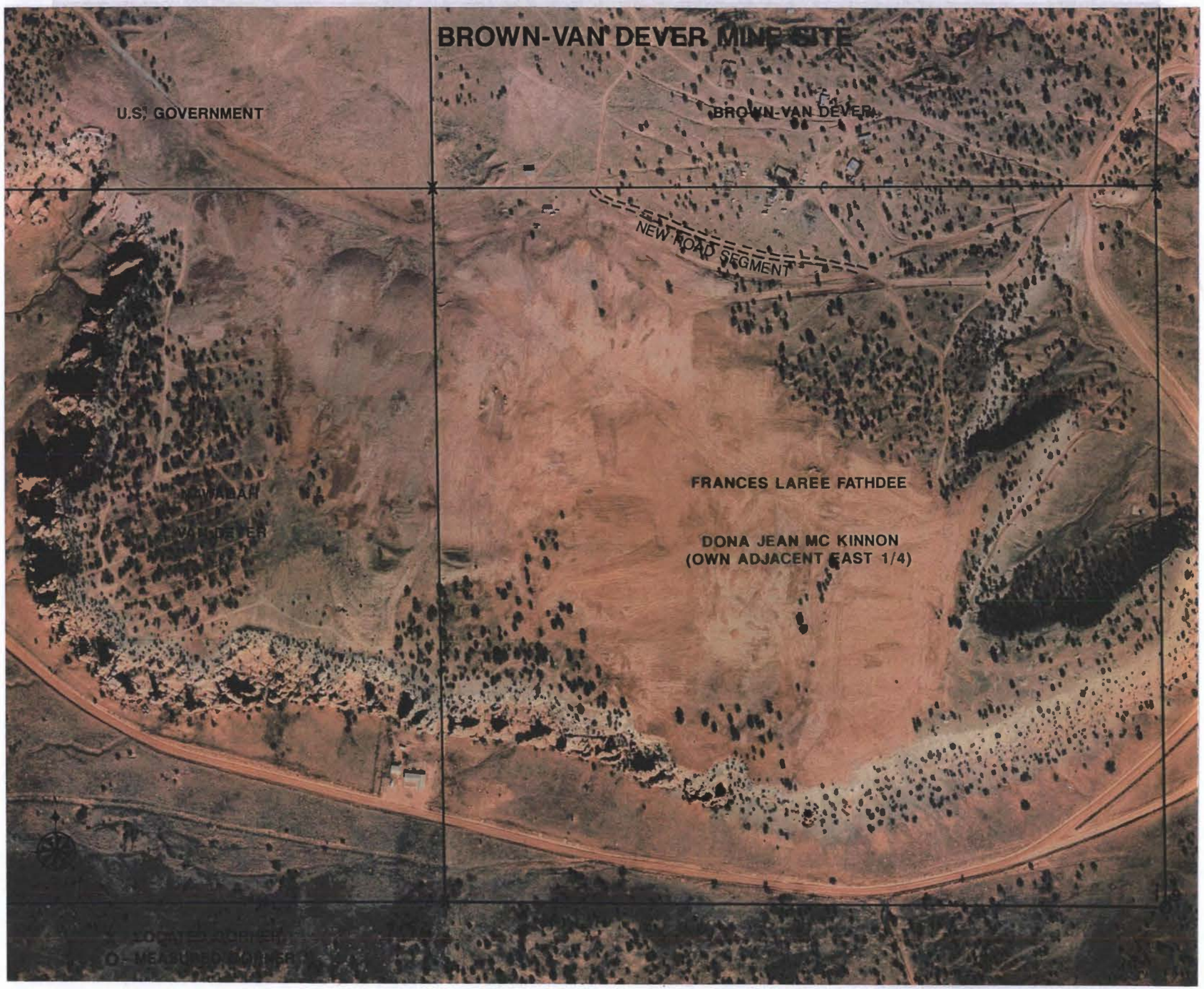

Figure 5. Brown-Van Dever Mine Site, November 13, 1991. Approximate scale 1:4,850.

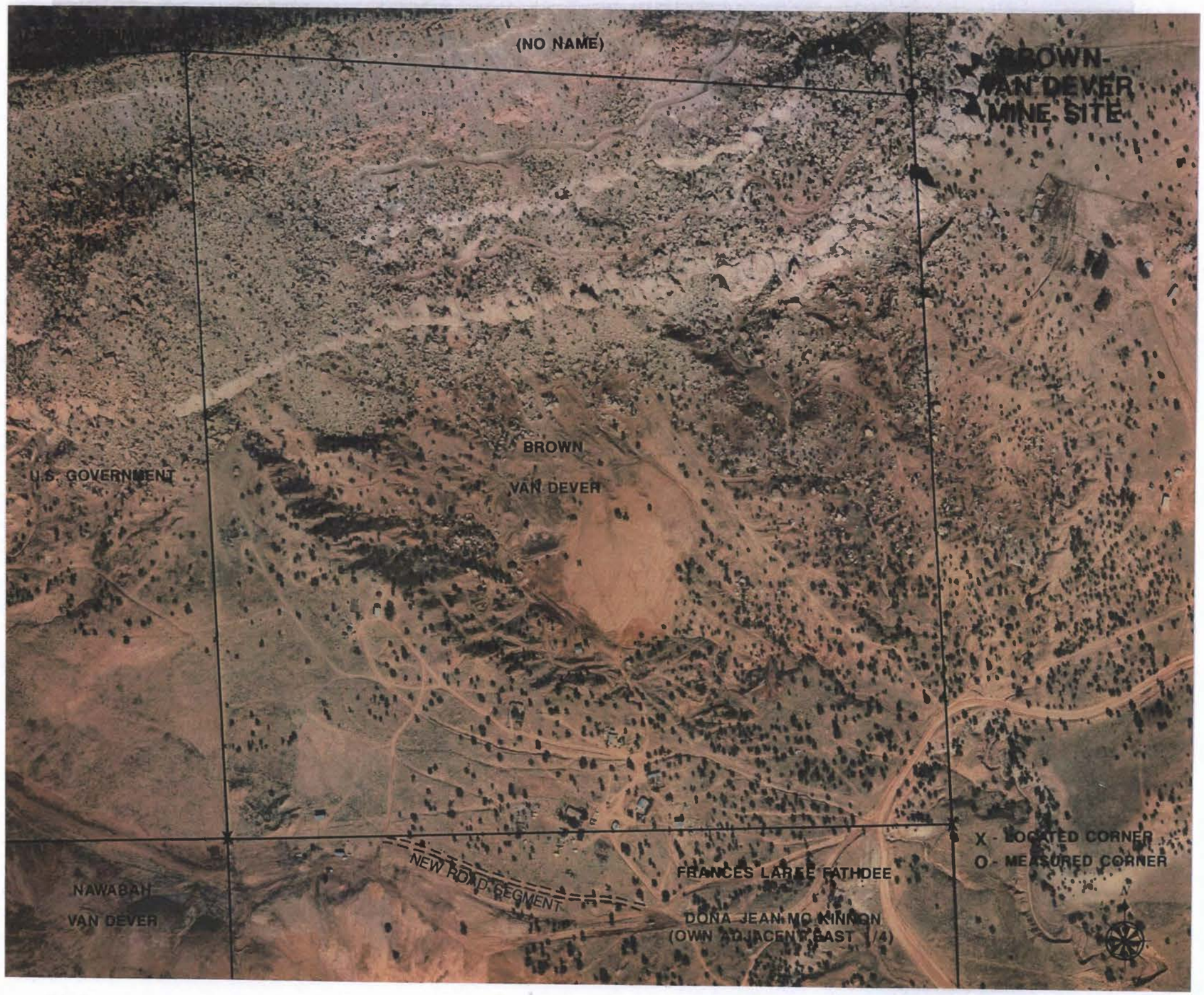

Figure 6. Brown-Van Dever Mine Site, November 13, 1991. Approximate scale 1:4,800.

Figure 7. Brown-Van Dever Mine Site, November 13, 1991. Oblique looking to the northeast.

Figure 8. Brown-Van Dever Mine Site, November 13, 1991. Oblique looking to the west.

Figure 9. Brown-Van Dever Mine Site, November 13, 1991. Oblique looking to the northeast.

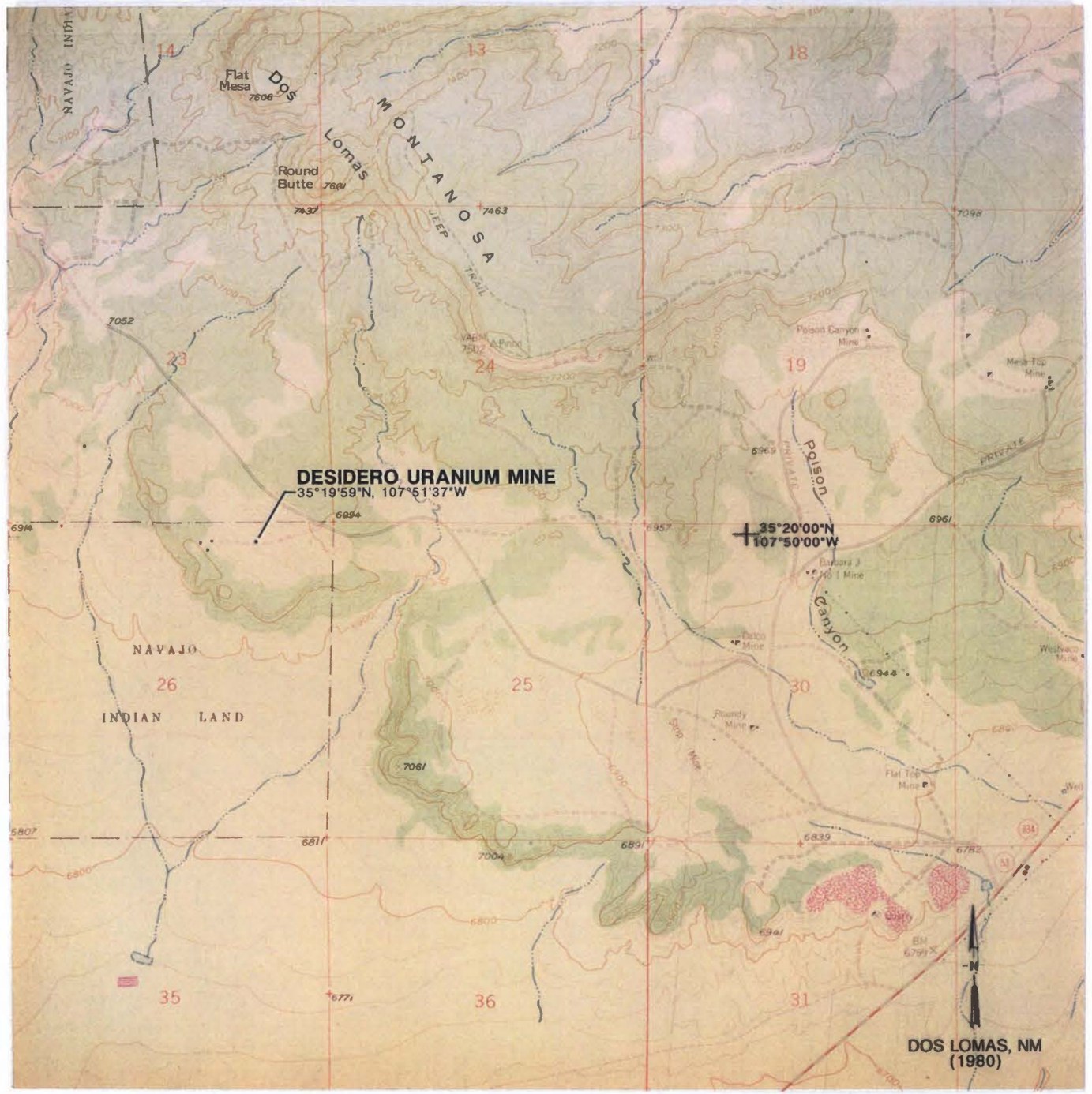

Figure 10. Local study area location map, Dos Lomas, New Mexico. Approximate scale 1:24,000.

DESIDERO MINE

Figure 10 is a map of the Desidero Mine area. Figures 11 through 13 are aerial photographs of the mine area. Since the first report was done, some clean up activity has been done at the mine site. The following tables show which piles were removed and which were not. The numbering system for the piles is the same as the previous report.

Piles that were removed. Volumes are in cubic feet:

Pile	Volume of the pile in Cubic feet	Surface area of the pile in square feet	Ground area under the pile in square feet
1	2820	3853	2753
2	3920	3366	2910
3	2108	2072	652
4	5109	1866	1294
5	5203	4874	2531
6	12465	5063	3518
7	9766	3682	3630
8	11364	3952	3490
9	8781	13900	4081
10	24416	17168	3163
11	89864	18126	11334
24	4803	2147	1240
25	999109	129909	75421
26	4993	2590	1038
27	36728	15015	8713
28	50818	14591	6364
29	1042	1289	1137
30	91767	35567	17582
31	61270	12947	8873
32	1569	1035	275
33	4331	1505	675
34	1935	1735	716
35	588	891	387
36	1543	5319	765
Total removed or capped:			
	1436312	302462	162542

Piles that still remain. Volumes are in cubic feet:

Pile	Volume of the pile in cubic feet	Surface area of the pile in square feet	Ground area under the pile in square feet
12	11778	4957	2404
13	40435	10690	2471
14	530326	205358	90547
15	33797	62486	18170
16	1881	3481	1513
17	6009	1375	1289
18	6106	2264	1678
19	75840	18168	7830
20	537667	200011	51259
21	3685	2889	1385
22	5291	4560	1093
23	1158	1704	402
37	306649	108393	53755
38	-	-	3974
39	-	-	6308
Total removed or capped:			
	1560622	626336	244078

It appears that pile 40 may have been capped. It is a very small pile and it was difficult to see.

40	-	-	1188

Summary

Total volume removed or capped for 24 piles = 1436312 cubic feet
= 53200 cubic yards
= 47.9% of total volume

Total volume remaining for 15 piles = 1560622 cubic feet
= 57805 cubic yards
= 52.1% of total volume

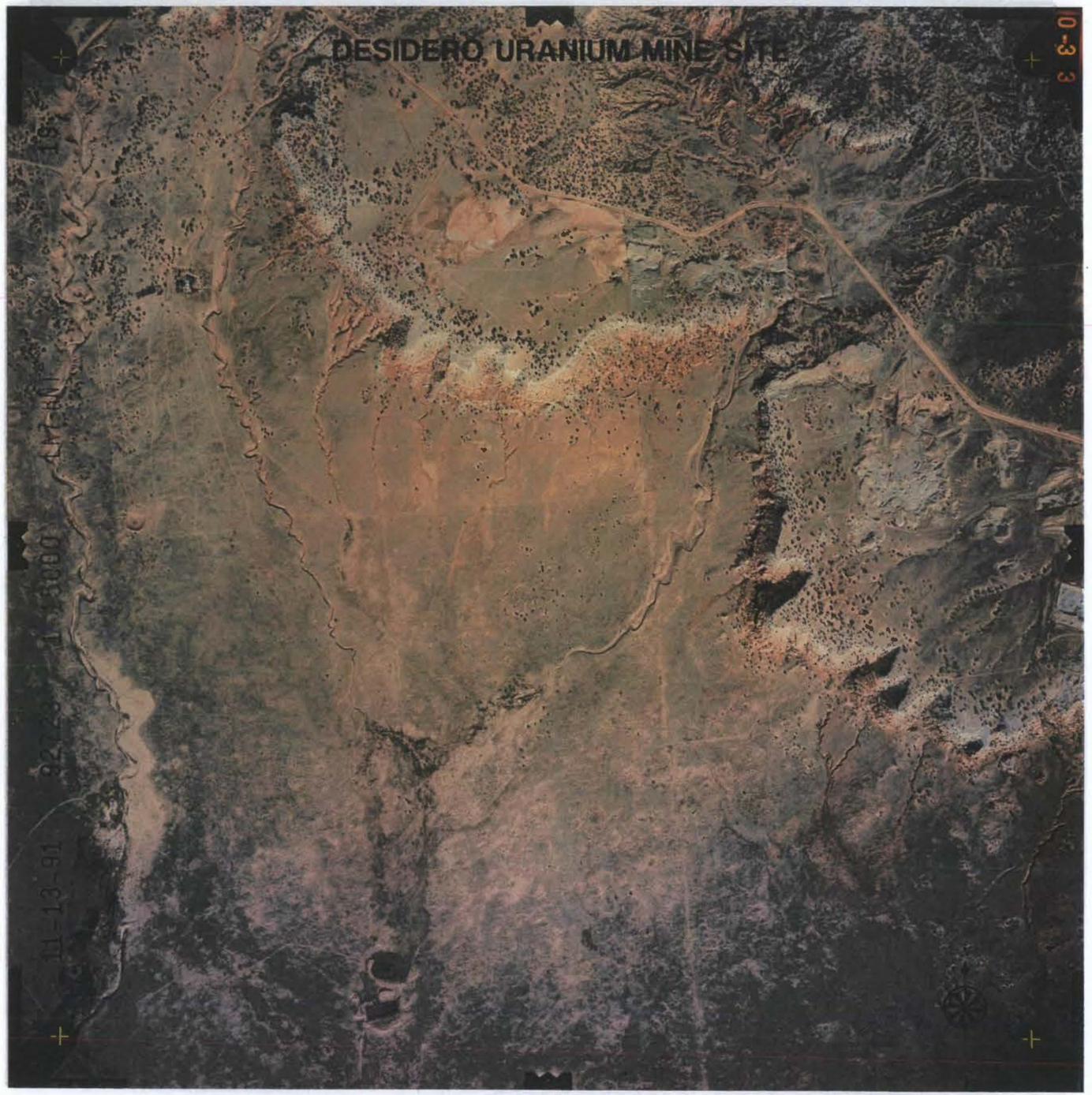

Figure 11. Desidero Mine Site, November 13, 1991. Approximate scale 1:15,000.

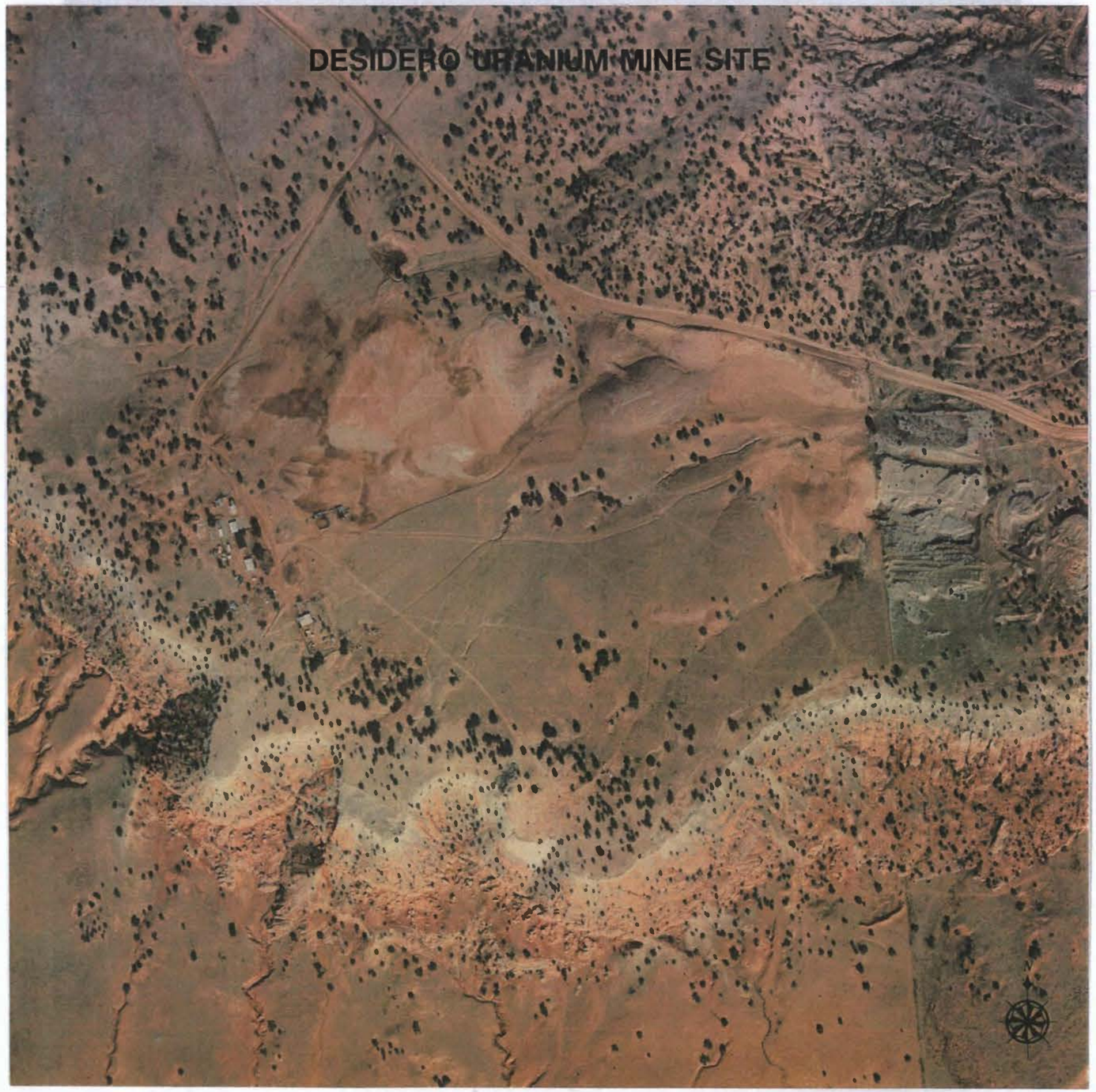

Figure 12. Desidero Mine Site, November 13, 1991. Approximate scale 1:4,980.

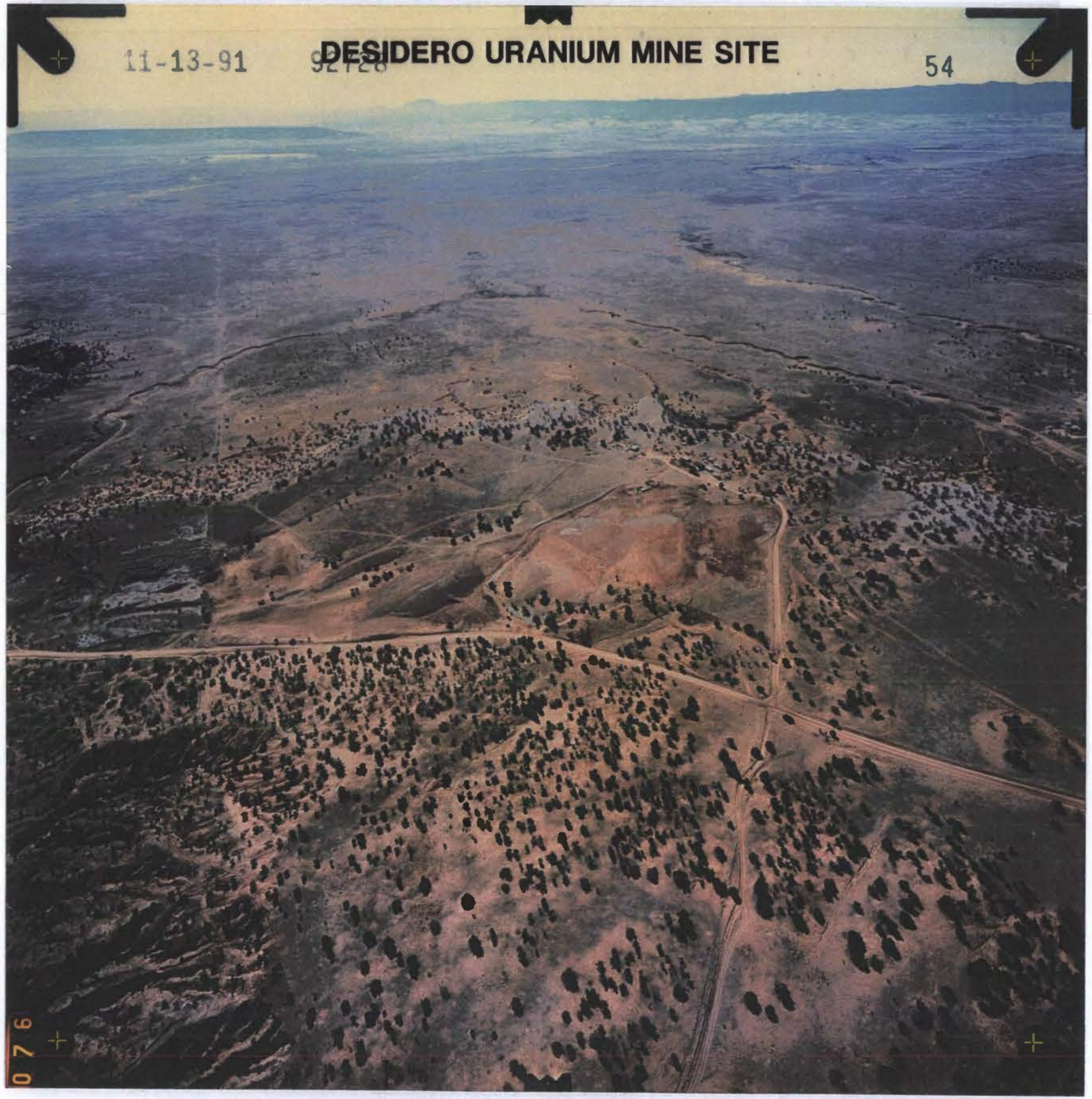

Figure 13. Desidero Mine Site, November 13, 1991. Oblique looking to the south.